

JTRS Technology Awareness Bulletin

Volume 1, #5

November 2003

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Existing Technologies

Wireless Ad-hoc Routing Software

Scientific Research Corporation (SRC) has developed a product called MobileRoute (<http://www.scires.com/mobileroute.htm>) that provides mobile, ad-hoc mesh network routing along with a variety of wireless QoS services, including lowest energy routing. Their product has been demonstrated with both the Army at Ft. Hood and the Air Force at Eglin AFB in March 2003. They are working with multiple DoD projects, including AJCN-Phase 2 and NetTempo, to extend the abilities of the product in ways that are directly applicable to JTRS. Some of the attributes of MobileRoute include:

- Independent of hardware or operating system
- Supports multiple operational environments – including LPI/LPD
- Provides energy efficient QoS
- Bridges between multiple routing protocols (OSPF, RIP, ZRP)
- Has been run on the JTRS Step 2C system
- Supports bandwidth/congestion-based routing
- Supports Simple Multicast and Broadcast Protocol (IETF draft)

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Developmental Items

Wireless Signal Improvements

Securant (<http://www.secureant.com>), after four years of private investment and working with Communications – Electronics Research, Development and Engineering Center's Applied Communications Information Network (Project ACIN) for the last three years, has developed advanced revolutionary algorithms for both innovative end-to-end encryption and increased signal gain. They are currently at Technology Readiness Level 6.

The software-based encryption module provides for full encryption of the wireless/IP header, and achieves denial of traffic analysis:

- Agnostic encryption of the payload (AES, DES, Blowfish, etc.)
- Encryption for IP switched system environments (e.g., VoIP, email, etc.)
- Usage of One-Time Pad encryption within the data stream
- Key Exchange Management
- Authorization Technology

The encryption software will be undergoing CECOM verification testing in mid-December 2003.

The software-based signal processing module provides for:

- Increased coverage area: Wireless devices can successfully transmit up to twice the distance because of bit error rate improvement
- Guaranteed Packet Delivery (GPD)
- Significant reduction in drop-off signals on a connected transmission
- Dramatic throughput increase of more than 40% (up to 3.98 in 8 bit error rate) resulting in a 200% or better improvement
- Dramatically increased range of the signal (twice the distance), without increasing the power from the unit or transmitter
- No packet loss within any connected transmission
- No garbles, crackles, delayed transmissions or echos (e.g., while talking on a cell phone)
- Electro Magnetic Interference (EMI) Protection
- Optional Voice Recognition Protection
- Elimination of broken signals on a connected signal
- Reduction of hypersensitivity to bit error rates when encrypting

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Research Results

Optical Signal Processing

Lenslet, an Israeli firm, (<http://www.lenslet.com/>) has developed a commercially viable, programmable, general-purpose optical digital signal processor (EnLight256TM) capable of up to 8,000 Giga MAC operations per second. They achieve this level of processing by using vector-matrix multiplication algorithms to both encode and decode signals. They have based their work on the assumption that the optics involved will be less than perfect, and factored that into the processing algorithms with success. They make use of lost cost, mass-produced components with a small form factor. A single EnLight256 is capable of replacing hundreds of individual DSPs.

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Research Initiation

None in this issue